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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/723,411	11/25/2003	Yogisha Mallya	140314-1	2690

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GENERAL ELECTRIC COMPANY
GLOBAL RESEARCH
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EXAMINER	
AZARIAN, SEYED H	
ART UNIT	**PAPER NUMBER**
2624	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/06/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/723,411	MALLYA ET AL.	
	Examiner	Art Unit	
	Seyed Azarian	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 November 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-46* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14,16-27,29-36,39,40,45 and 46* is/are rejected.

7)☒ Claim(s) *15,28,37,38,41-44* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *11/25/2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

1. Claims 3, 10-13, 22 and 34-39, are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claim 2 define "computer program one or more computer readable media, for gating image data". However, the claim does not define a "computer-readable medium", or computer readable medium encoded with a computer program, such claimed computer programs do not define any structural and functional interrelationships between the computer program and other claimed elements of a computer.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

3. Claims 1-5 and 19-24, are rejected under 35 U.S.C. 102(e) as being anticipated by Dunn et al (U.S. patent 7,024,021).

Regarding claim 1, Dunn discloses a method for determining edge voxels, comprising the steps of (see abstract, detection in a 3-D data volume);

calculating a gradient for each of a plurality of voxels by determining a maximum absolute gradient component relative to each adjacent voxel (column 3, line 65 through column 4, line 19, detecting data volume 3-D comprising a plurality of data traces, selecting a first set data of criteria for classifying each data traces, also column 10, lines 34-54, if the voxel is in the specified attribute range, compares the vertical attribute gradient at the current position (current voels values minus previous voxels values) to the gradient calculated in the previous voxels. If the current gradient is less than the previous gradient the subroutine has detected an infection point. If the no infection point is detected, then program flow continues to step 1016 where the voxel is checked to see if it is local extreme (minimum or maximum));

and identifying one or more edge voxels from the plurality of voxels based upon a comparison of the gradients of each of the plurality of voxels to a threshold edge gradient (column 6, line 36 through column 7, line18, using algorithm for voxel's edge detection and comparison, also column 10, lines 34-61, voxel comparison using gradient. The grow subroutine is then used to attempt to grow a geobody from the specified seed point based on specified stratigraphic criteria, as described above).

Regarding claim 2, Dunn discloses the method as recited in claim 1, wherein each adjacent voxel comprises twenty-six adjacent voxels (column 2, lines 54-63, there are two criteria commonly used. The other common criterion for being a neighbor is

sharing either an edge, or a corner. By this criterion voxel can have up to "twenty-six" neighbors).

Regarding claim 3, Dunn discloses a computer program, provided on one or more computer readable media, for gating image data, comprising: a routine for calculating a gradient for each of a plurality of voxels, wherein the routine for calculating determines a maximum absolute gradient component relative to each adjacent voxel (column 6, line 36 through column 7, line18, using algorithm for voxel's edge detection and comparison, also column 10, lines 34-61, voxel comparison using gradient. The grow subroutine is then used to attempt to grow a geobody from the specified seed point based on specified stratigraphic criteria, as described above);

and a routine for identifying one or more edge voxels from the plurality of voxels based upon a comparison of the gradients of each of the plurality of voxels to a threshold edge gradient (Fig. 8, column 8, line 63 through column 9, line 18, the computer program's main loop, from stared to end. If not the program proceeds the step where a new x, y, z voxel is picked and step 804 through 814 are repeated further column 9, line 44 through column 10, line 3, program flow returns).

Regarding claim 4, Dunn discloses an imaging system, comprising: an imager configured to generate a plurality of signals representative of one or more structures within a volume of interest; data acquisition circuitry configured to acquire the plurality of signals; data processing circuitry configured to process the plurality of signals, wherein the data processing circuitry is further configured to calculate a gradient for each of a plurality of voxels corresponding to the volume of interest by determining a maximum

absolute gradient component relative to each adjacent voxel and to identify one or more edge voxels from the plurality of voxels based upon a comparison of the gradients of each of the plurality of voxels to a threshold edge gradient (see claim 1, also Fig. 4 and 5, column 8, lines 4-31, advantage of constrains provided by the reflections (or minimum or maximum in data) from one trace to an adjacent trace);

system control circuitry configured to operate at least one of the imager and the data acquisition circuitry (see above, also column 6, lines 5-25, adjoining voxels to see if they fall within the user-defined threshold and display images);

and an operator workstation configured to communicate with the system control circuitry and to receive the plurality of signals from the data processing circuitry (column 6, lines 5-25, refer to user defined thresholds and displays, also column 9, lines 28-43, user selection).

Regarding claim 5, Dunn discloses imaging system, comprising: means for calculating a gradient for each of a plurality of voxels by determining a maximum absolute gradient component relative to each adjacent voxel (see claim 1, also column 6, line 66 through column 7, line 17, refer to threshold and comparison).

Regarding claim 19, Dunn discloses a method for identifying a structure of interest, comprising the steps of: providing at least one of a geometrical template and a functional template, wherein each template represents at least one characteristic of a structure of interest; and identifying one or more regions of the structure of interest based upon the similarity of the respective characteristic in the regions and the provided

templates (column 11, lines 30-61, the correlation of seismic reflection shape to a parameter of interest and further refer to comparison and similarity).

Regarding claim 20, Dunn discloses the method as recited in claim 19, wherein the geometrical template comprises a geometrical shape (column 11, lines 31-41, parameter and shape).

Regarding claim 21, Dunn discloses the method as recited in claim 19, wherein the functional template comprises at least one of a statistical homogeneity criteria, an intensity distribution, an intensity level, and a pattern (column 6, lines 5-25, distribution of light).

With regard to claims 22, 23 and 24, the arguments analogous to those presented above for claims 1, 3, 4 and 6 are respectively applicable to claims 22, 23 and 24.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 6-14, 16-18, 25-27, 29-36, 38-40, and 45-46, are rejected under 35 U.S.C. 103(a) as being unpatentable over Dunn et al (U.S. patent 7,024,021) in view of Celler et al (U.S. patent 7,103,204).

However regarding claim 6, Dunn discloses column 8, lines 4-31, Figs. 2B and 3A takes advantage of constrains provided by the reflections (or local minimum or maximum in data) to prevent runaway bleeding of the seed detection. Lateral propagation of a body from one trace to an adjacent trace is only allowed at the peak or trough position. But does not explicitly state its corresponding "dynamic constraints and wherein the merged candidate voxels become the seed voxels for the next iteration". On the other hand Celler in the same field of analyzing tomography scan images teaches (column 10, lines 46-67, the dynamic solution routine achieves this by directing the processor to perform calculations by imposing an "constraint to determine dynamic data values from the data stored in the input data matrices).

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Dunn invention according to the teaching of Celler because combination of Dunn and Celler dynamic data values that represents a physical property of the object at a respective corresponding one of the object's voxels, which can easily implemented in scanning device such as tomography.

Regarding claim 7, Dunn discloses the method as recited in claim 6, wherein at least one of the dynamic constraints is updated based on at least one of a cross section of the region and a local statistic of the region (see claim 6, also Fig. 2B column 6, lines 36-46, show a cross section of the 3-D data volume).

Regarding claim 8, Dunn discloses the method as recited in claim 6, wherein terminating the iterative process occurs when the queue of candidate voxels is substantially empty (column 9, lines 1-18, data volume have been analyzed. If so, the

program ends. If not, the program proceeds to step 816 where a new x, y, z voxel is picked and repeated, further lines 44-64, excess voxels are trimmed).

Regarding claim 9, Dunn discloses the method as recited in claim 6, further comprising selecting an initial set of seed voxels using one or more templates (column 8, line 63 through column 9, line 13, refer to initial x, y, z voxel selection).

Regarding claim 10, Dunn discloses a computer program, provided on one or more computer readable media, for segmenting a structure, comprising, a routine for iteratively merging one or more candidate voxels into a foreground region comprising at least one or more seed voxels, wherein the candidate voxels are merged based on one or more dynamic constraints and wherein the merged candidate voxels become the seed voxels for the next iteration (see claim 1, also column 8, line 63 through column 9, line 18, the computer program's main loop, from stared to end. If not the program precedes the step where a new x, y, z voxel is picked and step 804 through 814 is repeated further).

With regard to claims 11-14, the arguments analogous to those presented above for claims 1, 7, 8 and 9 are respectively applicable to claims 11-14.

With regard to claims 16-18 and 25-27, the arguments analogous to those presented above for claims 1, 4, 6, 8 and 9 are respectively applicable to claims 16-18 and 25-27.

With regard to claims 29-36, the arguments analogous to those presented above for claims 1, 6, 7 and 9 are respectively applicable to claims 29-36.

With regard to claims 38-40 and 45-46, the arguments analogous to those presented above for claims 1, 3, 6, 7,8 and 9 are respectively applicable to claims 38-40 and 45-46.

Allowable Subject Matter

6. Claim 15, 28, 37, 38, 41, 42, 43 and 44, objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Other prior art cited

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

(U.S. patent 6,842,638) to Suri et al is cited for angiographies method and apparatus.

(U.S. patent 6,408,201) to Foo et al is cited for method and apparatus for efficient stenosis identification in peripheral arterial vasculature using MR imaging.

(U.S. patent 5,832,134) to Avinash et al is cited for data visualization enhancement through removal of dominating structures.

(U.S. patent 5,273,040) to Apicella et al is cited for measurement of vertical volumes with cardiac MRI.

Contact Information

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Seyed Azarian whose telephone number is (571) 272-7443. The examiner can normally be reached on Monday through Thursday from 6:00 a.m. to 7:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella, can be reached at (571) 272-7778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application information Retrieval (PAIR) system. Status information for published application may be obtained from either Private PAIR or Public PAIR.
Status information about the PAIR system, see http:// pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Seyed Azarian
Patent Examiner
Group Art Unit 2624
March 27, 2007

Seyed Azarian